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APPLICATION NUMBER

FILING DATE

FIRST NAMED APPLICANT

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ATTY. DOCKET NO.

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MULPURI EXAMINER

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11 ART UNIT PAPER NUMBER

06/26/97

DATE MAILED:  
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This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

### OFFICE ACTION SUMMARY

- Responsive to communication(s) filed on 2/21/97
- This action is FINAL.
- Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

#### Disposition of Claims

- Claim(s) 1-10, 17-20 is/are pending in the application.  
Of the above, claim(s) 11-16 is/are withdrawn from consideration.
- Claim(s) \_\_\_\_\_ is/are allowed.
- Claim(s) 1-10, 17-20 is/are rejected.
- Claim(s) \_\_\_\_\_ is/are objected to.
- Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

#### Application Papers

- See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- The proposed drawing correction, filed on \_\_\_\_\_ is  approved  disapproved.
- The specification is objected to by the Examiner.
- The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

- Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- All  Some\*  None of the CERTIFIED copies of the priority documents have been received.  
 received in Application No. (Series Code/Serial Number) \_\_\_\_\_  
 received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

- Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e).

#### Attachment(s)

- Notice of Reference Cited, PTO-892
- Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_
- Interview Summary, PTO-413
- Notice of Draftsperson's Patent Drawing Review, PTO-948
- Notice of Informal Patent Application, PTO-152

--SEE OFFICE ACTION ON THE FOLLOWING PAGES--

**Part III DETAILED ACTION**

Applicant's election with traverse of group ii in Paper No. 3 is acknowledged. The traversal is on the ground(s) that the process for semiconductor layer can not be used to a materially different product. This is not found persuasive because the product claim it is not necessary how the product is made because the same product can be made in number ways such as formation III-nitride layer can be produced by different process such as using plasma instead of using ultraviolet light for ionization.

The requirement is still deemed proper and is therefore made FINAL.

Specification :

In page 6, line 17 the disclosure of formula for arsene is irrelevant because the invention is nothing to with arsene to form III-nitride layer; in page 7, line 4 disclosing of ammonia is not correct and it should be replace with "mercury".

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al.

Yamazaki et al discloses a method of making a semiconductor device by photo enhanced chemical vapor deposition by the following process steps;

providing a secondary reactant gas such as ammonia into the chamber;

providing a primary reactant gases such as  $\text{Ga}(\text{CH}_3)_3$ ;

and then providing ultraviolet light, which is produced from the mercury lamp, into the chamber and irradiates the reactant gases to produce reactant ions; then

finally depositing the reactant ions on the surface of the substrate to form III-nitride layers such as GaN layer(see col. 4, lines 15-33, col 5, lines 30-36, col. 6, lines 47-59).

Yamazaki et al do not disclose particularly dissociation of the nitrogen molecules into ions by the light emission. It would have been obvious to one of ordinary skill in the art to understand the dissociation of nitrogen must have been inherently present in the invention of Yamazaki et al because Yamazaki et al performs the process steps as similar to the process steps of instant invention.

Claims 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jp 07291791 document.

Jp 07291791 document discloses forming gallium nitride by using plasma in the chamber with reactant elements to grow epitaxial layers on the substrate(see abstracts and relevant description of Jp 07291791). However, in the reference it is not

clear whether xenon gas is used for excitation of the nitrogen or not. However, Jp 07291791 clearly disclose excitation cell gives plasma discharge luminous strength to readily excite the nitrogen gas (see advantage). It would have been obvious to one of ordinary skill in the art to understand xenon may be an alternate choice in the invention of Jp 07291791.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Moustakas et al disclose forming III-nitride layer by using plasma.

This office action has been created under the Patent and Trademark Office Semiconductor Technology Quality Assurance Pilot Program. It incorporates the examination quality standards set as a result of customer focus sessions with the semiconductor industry. The listing of the field of search to follow is one of these standards.

Field of Search	Date
U.S. Class and subclass: 437/5,126, 133,129,107,127 148/dig 113 427/582 117/105	6/16/97
Other Documentation: none	
Electronic data base(s): APS and WPIDS	6/16/97

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Mulpuri whose telephone number is (703) 305-5184. The fax phone number for this Group is (703)305-5184 .

Serial Number: 08/757873  
Art Unit: 1107

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

*Sd*  
S. Mulpuri

6/16/97

*D. E. Graybill*  
**DAVID GRAYBILL**  
**PRIMARY EXAMINER**  
**GROUP 1100**